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09/763,394	07/02/2001	Shinichi Sugihara	564131/0016	5266

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EXAMINER

JOHNSON, EDWARD M

ART UNIT	PAPER NUMBER
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1754

DATE MAILED: 08/28/2002

15

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/763,394

Applicant(s)

SUGIHARA, SHINICHI

Examiner

Edward M. Johnson

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 June 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 40-87 is/are pending in the application.
- 4a) Of the above claim(s) 74-87 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 40-73 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 12.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Election/Restrictions

1. Restriction is required under 35 U.S.C. 121 and 372.

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1.

In accordance with 37 CFR 1.499, applicant is required, in reply to this action, to elect a single invention to which the claims must be restricted.

Group I, claim(s) 40-73, drawn to a catalyst and process of making thereof.

Group II, claim(s) 74-87, drawn to a method of effecting the photo decomposition of a substance.

The inventions listed as Groups I and II do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: The claims of Group II require the special technical feature of bringing a medium into contact. The same or corresponding feature is lacking in Group I. Further, the Group I claims are anticipated or obvious over any of Mouri '072, Phillips '648, Ogata '241, and/or Hums '234 (see below). Consequently, a special technical feature which could link Groups I and II does not provide a contribution over the prior art, so unity of invention is lacking.

2. Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 74-87 are withdrawn from

consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 43-44, 47, 48, 51, 53, and their dependents are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 43, "those patterns" lacks antecedent basis or is unclear as to what is being referred to.

Claim 44, "the peak area obtained" lacks antecedent basis.

Claim 44, line 4, "that assigned" is unclear as to what is being referred to.

Claim 47, "the ESR" lacks antecedent basis.

Claim 48, "which" is unclear as to what is being referred to. Examiner suggests replacing "which yields" with --said catalyst yielding-- or --said signal yielding--, whichever is intended.

Claim 51 "the vacuum degree" lacks antecedent basis.

Claim 53, "the treatment system" lacks antecedent basis.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

6. Claims 40-49 are rejected under 35 U.S.C. 102(e) as being anticipated by Mouri et al. 5,872,072.

Regarding claim 40, Mouri '072 discloses catalytic compositions comprising titanium oxide (see abstract and column 5, lines 41-42), as semiconductors (abstract; semiconductors have stable oxygen defects) exhibiting NOx reduction (see column 13, lines 43-44), and having activity under ultraviolet, sunlight, and fluorescent lamp wavelengths (see column 12, lines 1-11).

Regarding claim 44, Mouri '072 discloses catalytic compositions comprising titanium oxide (see abstract), as semiconductors (abstract; semiconductors have stable oxygen defects) exhibiting NOx reduction (see column 13, lines 43-44), and having activity under ultraviolet, sunlight, and fluorescent

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lamp wavelengths (see column 12, lines 1-11). The bonding properties of the orbitals are considered to be stable and inherent properties over 1 week because the same stable compound comprising the same elements of the Periodic Table is disclosed.

When the examiner has reason to believe that the functional language asserted to be critical for establishing novelty in claimed subject matter may in fact be an inherent characteristic of the prior art, the burden of proof is shifted to Applicant to prove that the subject matter shown in the prior art does not possess the characteristics relied upon. In re Fitzgerald et al. 205 USPQ 594.

Regarding claim 47 Mouri '072 discloses catalytic compositions comprising titanium oxide (see abstract), as semiconductors (abstract; semiconductors have stable oxygen defects) exhibiting NO_x reduction (see column 13, lines 43-44), and having activity under ultraviolet, sunlight, and fluorescent lamp wavelengths (see column 12, lines 1-11). The ESR measurements are considered to be inherent properties of titanium dioxide because the same stable compound comprising the same elements of the Periodic Table is disclosed.

Regarding claim 49, Mouri '072 discloses catalytic compositions comprising titanium oxide (see abstract and column 5, lines 41-42), as semiconductors (abstract; semiconductors

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have stable oxygen defects), and titanium, zirconium, or hafnium (see column 4, lines 8-10).

Regarding claims 41 and 43, Mouri '072 discloses anatase and rutile type photocatalyst (see column 5, lines 55-57).

Regarding claim 42, Mouri '072 discloses particle size of about 0.01-25 microns (see column 5, lines 65-66).

Regarding claims 45-46, Mouri '072 discloses catalytic compositions comprising titanium oxide (see abstract), as semiconductors (abstract; semiconductors have stable oxygen defects) exhibiting NOx reduction (see column 13, lines 43-44), and having activity under ultraviolet, sunlight, and fluorescent lamp wavelengths (see column 12, lines 1-11). The bonding properties of the orbitals are considered to be stable and inherent properties over 1 week because the same stable compound comprising the same elements of the Periodic Table is disclosed.

Regarding claim 48, Mouri '072 discloses catalytic compositions comprising titanium oxide (see abstract), as semiconductors (abstract; semiconductors have stable oxygen defects) exhibiting NOx reduction (see column 13, lines 43-44), and having activity under ultraviolet, sunlight, and fluorescent lamp wavelengths (see column 12, lines 1-11). The ESR measurements are considered to be inherent properties of

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titanium dioxide because the same stable compound comprising the same elements of the Periodic Table is disclosed.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 50-73 are rejected under 35 U.S.C. 103(a) as being unpatentable over Phillips 5,989,648 in view of Mouri '072.

Regarding claims 50 and 53, 56-57 Phillips '648 discloses a method of producing titanium oxide catalytic materials (see abstract and column 1, lines 43-44) comprising activating with hydrogen and argon plasma (see column 1, lines 54-56, column 2, lines 60-64 and column 4, line 62-64), and operation at 1 Torr (see column 4, lines 36-37; substantially free from air compared to a volume at atmospheric pressure).

Phillips '648 fails to disclose a semiconductor.

Mouri '072 discloses a semiconductor.

It is considered that it would have been obvious to one of ordinary skill in the art at the time the invention was made to

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use the semiconductor of Mouri in the titanium dioxide catalyst making process of Phillips because Mouri discloses semiconductor in the form of titanium dioxide (see abstract, column 3, lines 41-43, and column 5, lines 42 and 50-59) for efficient removal of malodorous components with or without light irradiations (see column 3, lines 25-27, 42, and 52-53).

Regarding claims 51 and 54, 57 Phillips '648 discloses operation at 1 Torr (see column 4, lines 36-37; substantially free from air compared to a volume at atmospheric pressure).

Regarding claims 52 and 55, 58, 65-66, Phillips '648 discloses titania (see column 4, lines 20-21).

Regarding claims 59-60, Mouri '072 discloses anatase and rutile type photocatalyst (see column 5, lines 55-57).

Regarding claim 61, Phillips '648 discloses discloses operation at 1 Torr (see column 4, lines 36-37) and temperatures on the order of 3000 K (see column 5, lines 15-18).

Regarding claims 62-64, Phillips '648 discloses a method of producing titanium oxide catalytic materials (see abstract and column 1, lines 43-44) comprising activating with hydrogen and argon plasma (see column 1, lines 54-56, column 2, lines 60-64 and column 4, line 62-64), and operation at 1 Torr (see column 4, lines 36-37; substantially free from air compared to a volume at atmospheric pressure). Mouri '072 discloses a semiconductor.

Regarding claims 67-69, Phillips '648 discloses reduction (see column 1, lines 55-56).

Regarding claim 71, Phillips '648 discloses thin films (see column 1, lines 56-60). Mouri '072 discloses granular and sheet form (see column 12, lines 15-20).

Regarding claims 70 and 72-73 Phillips '648 discloses a method of producing titanium oxide catalytic materials (see abstract and column 1, lines 43-44) comprising activating with hydrogen and argon plasma (see column 1, lines 54-56, column 2, lines 60-64 and column 4, line 62-64), and operation at 1 Torr (see column 4, lines 36-37; substantially free from air compared to a volume at atmospheric pressure). Mouri '072 discloses a semiconductor. Use limitations are not considered to further limit a method for producing a catalyst. However, Mouri '072 discloses sheets, bags, and woven or nonwoven fabrics (see column 12, lines 25-37).

Response to Arguments

9. Applicant's arguments filed 6/13/02 have been fully considered but they are not persuasive.

It is first noted that the Examiner's position is that stable oxygen defects are an inherent characteristic of the prior art semiconductors. Applicant does not appear to argue that the cited prior art would be devoid of stable oxygen

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defects, arguing only that this inherent feature is not disclosed. For Applicant's benefit, further information to that effect has been attached. See for example, Sonoda '080 (1981) column 1, second paragraph, "As is known, it is possible to lower the resistivity of an n-type metal oxide semiconductor... to increase oxygen defects of the metal oxide utilizing the n-type characteristic of the oxide."

It is argued that the claims are not simply to a TiO_2 catalyst. This is not persuasive because oxygen defects are an inherent feature of the prior art semiconductor, as noted in the previous Office Action. The recitation "some activity" is broadly interpreted as activity of any kind under visible light. Since visible light itself is radiation, some activity under the entire visible light spectrum would also be an inherent feature of the catalyst taught by the prior art. Applicant does not argue that the defects of the prior art are instable or that they are inactive under visible light. Applicant merely argues that these inherent features are not disclosed, as the Examiner has also already noted in the previous Office Action.

It is argued that claims 41-43 depend from claim 40. This is not persuasive because claim 40 stands rejected.

It is argued that independent claim 44 is also rejected by the Examiner. This is not persuasive because oxygen defects, are

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all inherent feature of the prior art semiconductor, as noted in the previous Office Action. 1s and 2p electrons are also inherent features to all atoms in the Periodic Table, and thus would also be inherent to the catalysts of the prior art.

It is argued that the Examiner has noted a concern that the functional language asserted to be critical for establishing novelty in the claimed subject matter may be an inherent characteristic of the prior art. This is not persuasive because Applicant appears to suggest that a novel process must correspond to a novel product and that an inherent feature cannot be "introduced". It is initially noted that these method features are not recited in the product claims. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Further, 1s and 2p electrons are inherent features of any atom, oxygen defects are both "introduced" and inherent to semiconductors, and at least some activity under visible light radiation are inherent to photocatalyst, and thus all are inherent features of the prior art. Further, Applicant relies on the method steps as providing novelty to the claimed product while Phillips (above) discloses activating with hydrogen and

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argon plasma (see column 1, lines 54-56, column 2, lines 60-64 and column 4, line 62-64).

It is argued that claims 45-46 depend from claim 44. This is not persuasive because claim 44 stands rejected.

It is argued that in conclusion, Applicants find no teaching or suggestion of stable oxygen defects. This is not persuasive because oxygen defects are an inherent feature of the prior art semiconductor, as noted in the previous Office Action.

It is argued that as previously stated above, Mouri fails to teach that semiconductor oxides ordinarily have stable oxygen defects. This is not persuasive because Applicant appears to admit that semiconductor oxides "ordinarily have stable oxygen defects" but asserts that the claims are patentable anyway, since Mouri does not teach this otherwise "ordinary", or inherent, feature.

Conclusion

10. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened

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statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.


11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Edward M. Johnson whose telephone number is 703-305-0216. The examiner can normally be reached on M-F 6:30-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven P. Griffin can be reached on 703-308-1164. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

EMJ

August 21, 2002


Stanley S. Silverman
Supervisory Patent Examiner
Technology Center 1700